BULLETIN
OF THE
Ohio Agricultural Experiment Station

NUMBER 180. FEBRUARY, 1907

RENEWAL OF OLD ORCHARDS.

BY F. H. BALLOU.

There is a peculiar fascination, for most home-owners, in the study of horticultural journals, fruit lists and catalogues; in the deliberate selection of the more promising varieties of fruits, and in the planting, culture, fertilization and pruning of well grown, thrifty, young fruit trees. There is the pleasure of anticipation in looking forward to to the time of fruition, when twig and branch shall bend with the weight of highly colored, ripe, luscious fruits, and when the tables of library, dining-room and kitchen shall bear evidence of the forethought of the owner, and the liberality of nature in rewarding the diligent.

* * * *

But there is an interim between the planting of the tree and the gathering of the first fruits. Oftentimes this interim proves to be an extended, tedious, patience-taxing period of waiting. More and more time and care are annually expended upon the young trees in an endeavor to hasten them into fruit bearing, resulting only in an increased, heavy production of wood and foliage, and a failure to secure strong, well developed fruit-buds. This is only a natural sequence, when the soil is fertile and high culture bestowed. It is by no means a loss, and should not be so considered; for the trees are becoming more and more fully prepared for future, heavy fruit bearing.

But the seasons glide swiftly by—fruitless seasons—in which children and adults, alike, hunger for fruit and are compelled to look upon only empty baskets and barren cellar shelves.

* * * *

And all the while, perchance, there stands upon the old farmstead a score or more aged, neglected trees—the remains of the old home orchard which, for decades, filled to overflowing, with crimson and golden fruits, shelves, barrels, bins and boxes, in the cellar of the old farm dwelling. Weeds and brambles have taken the place of the close-cropped bluegrass turf, the cleanly cultivated surface, or the neatly planted and well-cared-for hoed crops of former years.

Dead, dying and broken branches upon the trees, and prostrate and decaying branches on the ground, tell a tale fully corroberated by a dull and rust-eaten pruning saw lodging, long forgotten, between roof and rafter, in an abandoned attic. The continuous tapping of a company of Downy Woodpeckers relates the sequel to a story of partial death and decay; and the knotty, distorted, immature, wormy fruits which drop to the ground, hidden by the rubbish, nosed and nibbled by the meadow-mice, are in evidence of the undisputed, unrestricted sway of fungi and insect pests.

* * * *

Someone observes that such orchards are the exception rather than the rule. It is well that this is true. Yet we occasionally see just such orchards. That they are a standing menace to the neighboring newly planted orchards, is a fact so evident as not to need discussion. Sometimes the owner awakens to this fact and with axe and brush-hook, dynamite and fire, clears away the object of his suspicion and removes from sight, forever, an institution which, perhaps for half a century, was a faithful, fruitful, beautiful adjunct to the homestead. This, deplorable as it may seem, is preferable to allowing the old orchard to remain in the condition first described—a source of infection, a breeding-place for all enemies and diseases to which a newly planted orchard is heir.

But this, the policy of obliteration, affords no fruit while the young trees are growing. The question of supplying present need remains unanswered.

* * * *

Others we have known, who were possessed of sufficient sentiment to move them to partially renovate the old orchard for the sake of old memories and in consideration of the good it has accomplished and the blessings it has afforded through a well-spent life of abundant fruitfulness. Usually, from these motives, the process of renovation is simply one of "pruning up and scraping down." Fruit is but a secondary—a lesser consideration. The trees are supposed, henceforth, to be capable only of availing themselves of a well earned rest, to afford a pleasant shade for man and beast, and to drop, perchance, quite incidentally, an occasional, indifferent specimen of fruit from heights unexplored, unsprayed and unattainable.

We honor the man with whom such sentiment prevails. He is incomparable with the owner of the abandoned, totally neglected orchard. In some respects he has surpassed his neighbor to whom the defensive suggests annihilation with axe and torch. He has at least displayed a tendency toward reclamation; he has done the best he knows to do. But he and his family hunger for fruit—there is

little for basket and none for store; and his trees, after all, remain a breeding place for insects and fungi, endangering the young or newly planted, growing orchard in which his hope is anchored.

* * * *

Still others have we known. These not only with intelligence, hopefulness and an inherent spirit of thrift, plan and plant young orchards, giving to these the best of care—such as will hasten a healthy development of trees and promote early and abundant fruitfulness; but they turn with wisdom and confidence toward the old home orchard, having learned that, with skillful care it will, with seeming gratefulness and appreciation for the time and attention bestowed, so promptly and generously respond as to bridge the interim of waiting with rich harvests of red and gold.

This transformation, great and wonderful and pleasing though it be—the lapsing of a tree heavy with years and more or less enfeebled by decades of generous fruit bearing into renewed youthfulness and vigor and luxuriance and productiveness, need not suggest anything uncanny—a conjuror's incantation, the passing of a magician's wand, or the supernatural in any form. Far from it. It is the natural result of the combination of a practical orchardist, common sense, common tools, inexpensive material, hard work, courage and perseverance.

* * * *

Are the trees of the old orchard so lofty in branch as to be out of reach of pruners and sprayer and ladder and fruit picker? They are cut down a third or a half in height. Are there dead and dying branches? They are smoothly sawed away, and the wounds neatly dressed with lead and oil. Does a great bole or branch show indications of splitting down? If not too far advanced, a brace and long bit, and a bolt with nut and large washer repair the injury. Are there gaping cavities or hollows in body or branch, gradually enlarging through decay? These cavities are carefully cleaned out, sprayed inside with Bordeaux mixture and filled with Portland cement. Are the bodies and branches rough and unsightly with scaly bark, moss and lichens? They are scraped clean and smooth with a dull hoe or scraper, and the entire surface washed or sprayed with Bordeaux mixture. Has the fruit heretofore been defective from the infestation of insects or fungi? Repeated sprayings with Bordeaux mixture and arsenites, applied in so thorough a manner that not a leaf, twig, branch or fruit, crevice or square inch of surface in any part is left untouched or uncovered, will bring smooth, sound fruit. Has the soil become impoverished through abuse or long continued crop production without feeding? There is applied a liberal dressing of stable

manure which is either worked into the upper few inches of soil beneath the extremities of the branches, or covered with a few inches of straw, corn-stalks or other coarse material applied as a mulch. Do the cellar bins need repairing, and is there an ample supply of crates and baskets? It would be well to prepare for the day of harvest; for there will be a bountiful reward when the fruit-picking season comes.

PRACTICAL LESSONS IN ORCHARD RENEWAL AT THE OHIO EXPERIMENT STATION.

PHOTOGRAPHS BY THE AUTHOR.

The Ohio Experiment Station, recognizing the importance of orchard renewal, and desiring to take up the matter in such a way as to afford an object lesson to Station visitors, is especially fortunate in having, on its South Farm, where the horticultural field work is carried on, a block of apple orchard planted about forty years ago, or some 25 years previous to the time that the Station came into possession. The trees, most which of were in a fair condition as to health and vigor, had become so tall as to render spraying very difficult, slow and laborious, hence very expensive; and the gathering of fruit with ladders almost an impossibility. The trees continued to produce a fair quantity of fruit, but, as is almost invariably the case with top-lofty trees, the crop was produced upon the extremities of the uppermost branches—the lower branches merely existing, in an environment illy suited to the development of healthy wood, foliage, fruit-buds and fruit.

The object in view, in the process of renewal, was not to demonstrate that an old orchard could or should be made to take the place of a young orchard, but to cause it to lapse into renewed, profitable fruit production, fully covering the interval from the time of planting young trees until they should come into generous fruit-bearing.

To bring about, in the old orchard, the conditions necessary to attain the object in view, it was considered of first importance that the height of the trees be reduced very materially. Indeed, upon this severe cutting back or "heading down" rested the whole plan of renewal. For, as a natural result, would follow the production of a vigorous system of new wood at a reduced altitude; the reinvigoration or rejuvenation of the lower or more horizontal branches which, under former adverse conditions, had been only inactive members of the tree, their fruit annually dropping in an early stage of development through want of necessary conditions of light, heat and sustenance.

FIG. 1—Trees before cutting.

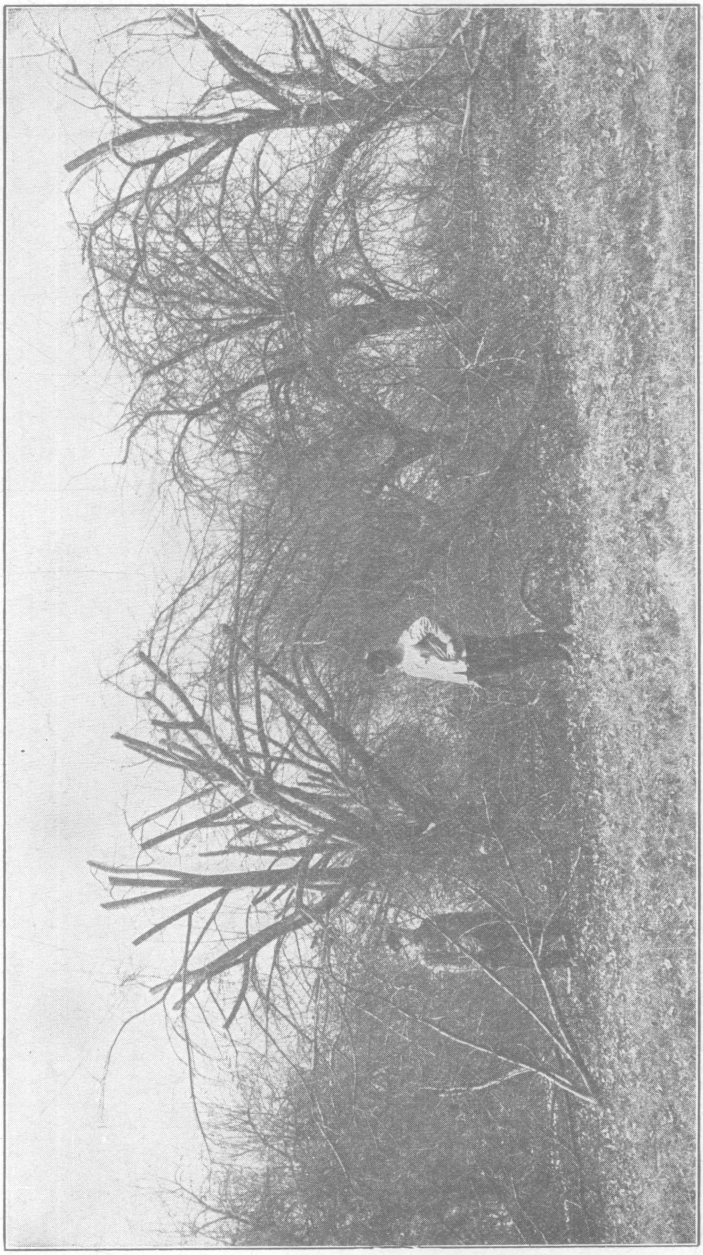

FIG. 2—Trees after cutting.

FIG. 3—Trees after cutting.

As a beginning, only two rows of trees, at the north end of the orchard, were cut back. This work was done in the latter part of the month of March, 1905. Figure 1 shows the character of the trees at time the workmen were ready to mount their ladders and ply their saws. It will be apparent, upon reference to this picture, with what difficulty the topmost branches of such trees could be reached with our long extension spray rods, or tallest ladders. An overseer remained upon the ground and carefully directed the work, indicating, from his vantage ground, the particular point at which each branch should be sawed. The work of cutting back was arduous and tiresome, because of the perilous footing and positions of the workmen; but fair progress was made and at two "sessions," each a half-day in length, the task of sawing was accomplished. Fig. 2 gives an idea of the severity and apparently cruel degree of pruning by which the trees were relieved of their upper hemispheres, and in Fig. 3 a view from the opposite end of the rows, after removing the brush. The cuts made by the saws were at an angle, where it was possible to accomplish this, affording for the more perpendicular branches a slope that would quickly shed the water from rain or melting snow. The wounds were covered, some days later, after the orchard had been cleared of the great, prostrate branches and abounding brush, with a heavy coat of thick paint made of pure white lead and boiled linseed oil. The objectionable feature of painting so soon after cutting, at this particular season of the year, is that the rising sap causes the surface of the wound to remain moist or wet and not in the best condition to receive and hold a substantial coat of paint. Hereafter it will be preferred to postpone the dressing of the wounds until the surfaces have become dry and somewhat "checked" by the action of wind and sun, in which condition they receive, and hold very persistently, the mixture as it is applied. Paint of any color, providing it be a good quality of lead, will answer; but neutral colors, such as slate, brown or gray should have the preference as these are less conspicuous.

Should there be, among the number of trees renewed, one or more varieties which are of little value, or for any cause undesirable, it is both interesting and profitable to graft into the large stocks left after cutting back the branches, a choice variety, or several varieties, to suit the demand of the market, or to gratify individual tastes in the family, where the fruit is more especially desired for home consumption. It is with peculiar pleasure to the writer, that the reader may here be referred to the frontispiece—the illustration on the first cover page of this bulletin. The picture is from a photograph of a very unusual example of precocious fruiting of a newly made graft. The great cluster of apples was

produced upon a graft set but eighteen months, or the second season after setting. I desire it to be clearly understood that this early and abundant fruiting of a graft is *unusual;* but the picture so strikingly illustrates, within a very small compass, the plan of grafting, and is at the same time so admirably suggestive of the idea of *rejuvenation* or the *renewed youthfulness* of an aged tree, or a part of an aged tree, that it is gladly submitted with this explanation.

The growing grafts of the newly added varieties should be treated just as will be suggested, farther on, for the strongly growing shoots springing from the extremities of the stubs of branches left after cutting back.

Providing that the new growth of wood of the new varieties be properly thinned and restricted by clipping back each spring, and the new shoots persistently coming from the old stock be faithfully removed by rubbing off as fast as they appear, there should be some fruit produced on the grafts the third or fourth season after setting.

The results of the cutting back of the old trees were quickly apparent, not only in a profuse bloom and the setting of a heavy percentage of fruit on the lower branches, but in the persistence of the young fruits in clinging to the trees, and the rapidity of their growth. That which had previously been the almost sterile, lower hemisphere of the tree was quickened into renewed life and vigor and fruitfulness. Spraying, which, previously, had been so arduous a task, so unsatisfactory and imperfect, at once became a pleasure, so effectually could the work be done with so slight an expenditure of power and labor. Consequently insect enemies and fungous diseases were fully exposed to the merciless storm of Bordeaux mixture and arsenites blown with force from contiguous spray nozzles.

In addition to the heavy crop of growing fruit, the old trees, thus renewed, threw out, with but few exceptions, a remarkably vigorous growth of new wood from the stubs of branches left. Indeed, so promptly did the trees assume a well-rounded, dome-like head, developed by the growing wood and dense foliage, that before the close of the first growing season the loss of the large, upright branches could hardly be noticed. In Fig. 4 is shown the characteristic form and appearance of the renewed trees during the first season's growth after cutting back. The same tree is shown in Fig. 5, in apple-picking season, with its actual crop of fruit just taken off by the pickers who have now reached the climax of an experiment in which they manifested particular interest and enthusiasm the season through. The variety is the Wells, and the total product of picked fruit 24½ bushels. Six or seven bushels were previously gathered from the ground and made into cider; hence the total product for the season was about thirty bushels.

FIG. 4—First season's growth after cutting—Thinning fruit.

FIG. 5– First crop of apples after renewal. Variety, Wells.

Nor did this particular tree stand alone in successful fruit production in the season of pruning back. Among the number were both Baldwin and Baltimore trees which gave good yields of sound, perfect fruit.

As has already been stated, the renewal of the trees produced a vigorous growth of new wood from the upper extremities of the large stubs left after cutting away the branches. Neglect to follow renewal with a judicious thinning out of superfluous shoots, and the cutting back of those remaining, would mean failure to attain the true purpose of this heavy pruning. In Fig 6 is shown a part of the orchard at the beginning of the second growing season after renewal. Over one-half of the new shoots were pruned out, and those chosen to remain clipped back with the pruning shears from one-third to one-half their length. This thinning and clipping back of the new shoots tends to keep the tree in low, compact form, and will eventually lead to the formation of healthy, strong fruit buds over the entire area of new, sturdy, bright, clean fruiting-wood.

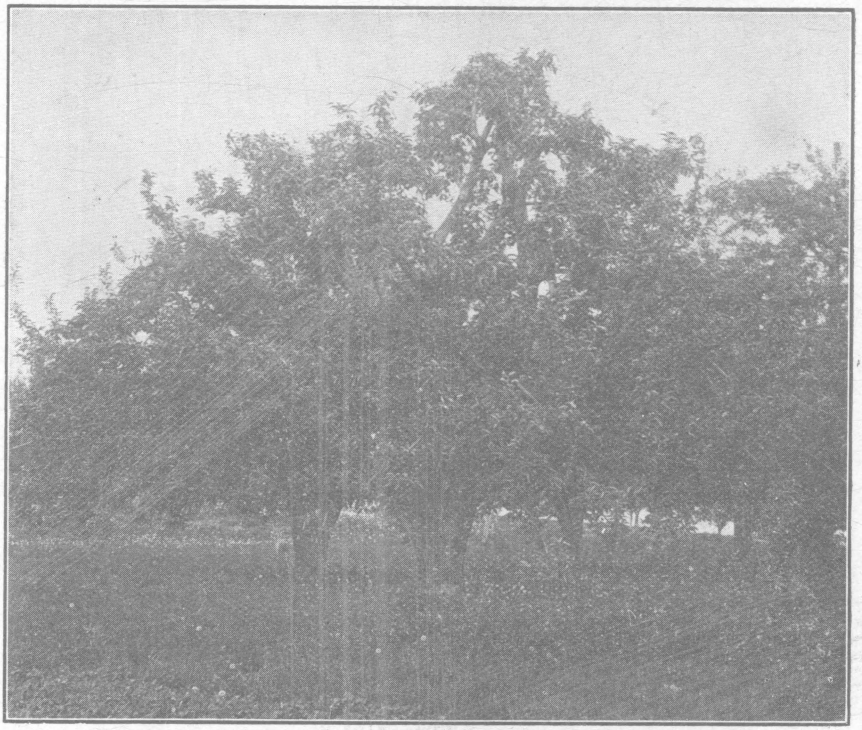

FIG. 6—Orchard at beginning of second season's growth after renewal.

So satisfactory was the process of renewal, upon the two rows of trees first chosen for the experiment, that in the spring of 1906 the work was extended, taking in the greater part of the old orchard.

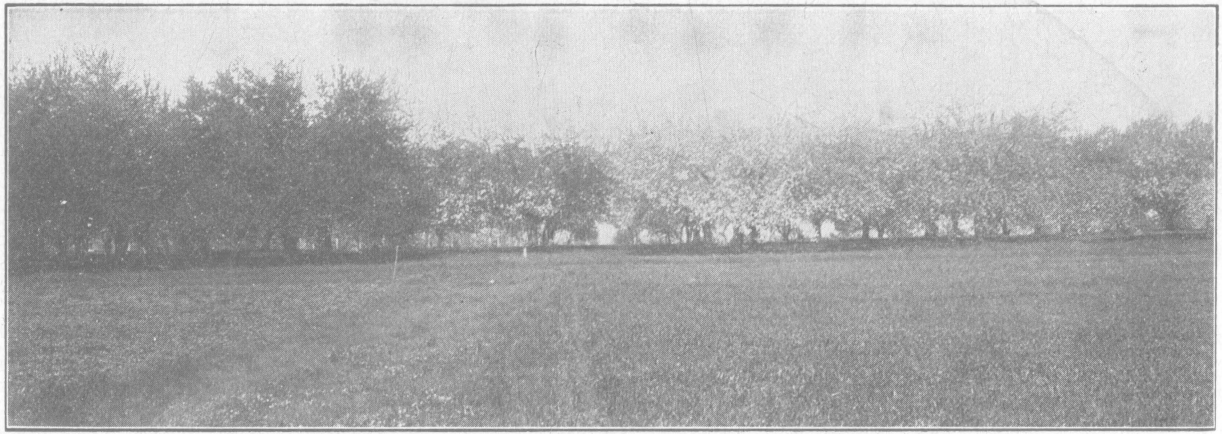

FIG. 7—Distant view of old orchard, showing renewed and unrenewed blocks of trees.

The remainder will probably be renewed in the spring of 1907. In Fig. 7 is presented a distant view of the old orchard after the more extensive renewal of 1906. This picture strikingly illustrates the reduced elevation of the renewed section, as compared with the unpruned portion. The trees renewed were snowy white with blossoms at the time the picture was taken. The taller, or uncut trees, are Baldwins, and showed no blossoms in 1906—this being the Baldwin's "off year."

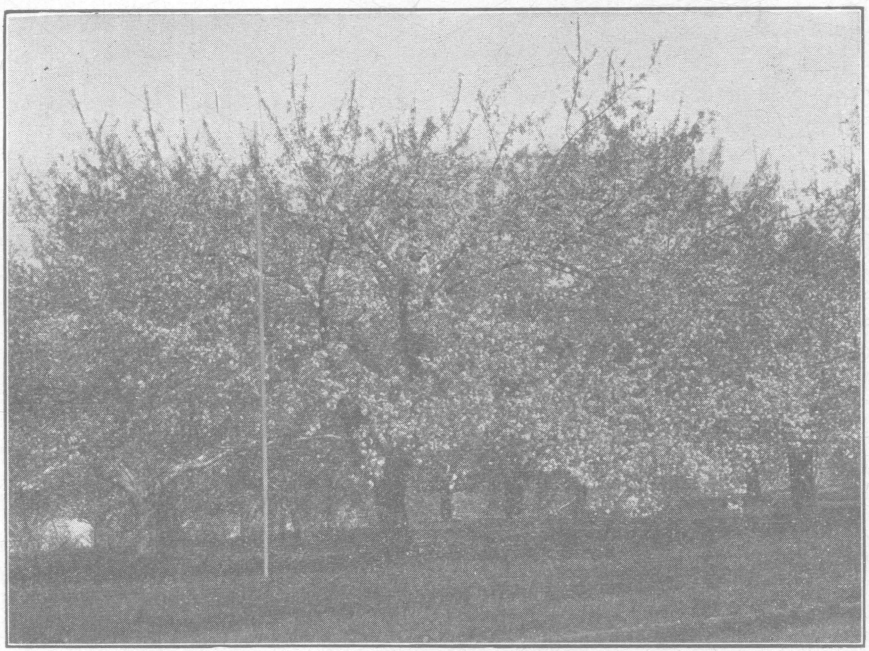

FIG. 8—Maiden Blush tree after cutting back

Fig. 8 shows a great Maiden Blush tree after cutting back. Its extreme height before cutting rendered the gathering of fruit by hand out of the question, as no ladders at the Station would enable the workmen to reach the fruit which persisted in growing on the topmost branches. The crop of the season of 1906, an unusually good one too, was easily gathered from an eighteen-foot ladder.

In Fig. 9 is pictured a tree of Baltimore, or Flushing Spitzenburg, with its second crop of fruit at the close of the second season after renewal. An autumn storm of wind and rain was in progress when the picture was taken, which accounts for the blurring of the foliage in the picture.

FIG. 9—Second season's crop, after renewal, picked from a Baltimore tree.

It can safely be asserted that the pruning back of these old trees, from one-third to one-half their height, by no means resulted in a proportionate decrease in the quantity of fruit produced. On the contrary, it was clearly evident that the total product was materially increased by the treatment. And with the increase in quantity came a marked increase in size of individual specimens. Adding to this the unusual soundness of fruit from very thorough spraying, and the accessibility of the crop when picking time came, enabling the greater portion of the fruit to be gathered from an eight-foot step-ladder (see Fig. 4 in which the workman is shown thinning fruit), the only conclusion at which the horticultural student can logically arrive is that the process of renewal is immediately and continually successful, profitable and gratifying.

RENEWAL OF FRUIT TREES OTHER THAN THE APPLE.

What has been stated with regard to renewal of old apple trees may be applied with equal, or even greater force, to old peach trees. The peach tree is a rapid grower under ordinarily favorable conditions. It bears fruit only on wood of the previous season's growth. Its characteristic habit of growth is to form tall, erect branches, in its early years, becoming more spreading as its age increases; hence a few seasons' unrestricted, natural development, where care and pruning has been neglected, results in a tall, ungainly, illy proportioned top, formed by long, straggling, slender branches at the extremities of which, out of reach from the tallest step-ladders, the fruit is borne. The weight of the fruit, at the extremities of these highly or widely extended branches, brings so great a leverage to bear upon their bases as to result in serious splitting, breaking and mutilation of the trees. Careful, annual pruning back of the new growth, from the time the young trees are planted, tends to overcome this undesirable habit of growth and to keep the head of the tree compact and symmetrical, thereby lessening the danger of breaking by reducing the leverage exerted by the weight of the crop, and rendering the gathering of the fruit an easy and pleasant task. But even with careful, annual pruning, the peach tree will eventually get out of proportion and out of reasonable bounds. It is at this time that a complete renewal becomes advisable. This can be accomplished without the loss of a crop, providing the work be done early in the spring of a season in which the fruit buds have been destroyed by the rigors of winter, as is often the case in all sections of Ohio other than those bordering on Lake Erie. Where annual crops are the rule, the fortunate orchardist may cut back a few of of the branches of each tree each season, thereby keeping an adequate supply of new fruiting wood coming on, low down where

pruning and spraying may be easily done, and where the crop may be safely supported by the superior strength of the short, sturdy, well-knit branches. Thus, gradually, the trees will become renewed, there will be no material loss in fruit production, and the fruit will be of larger size because of the decreased number of specimens to be developed.

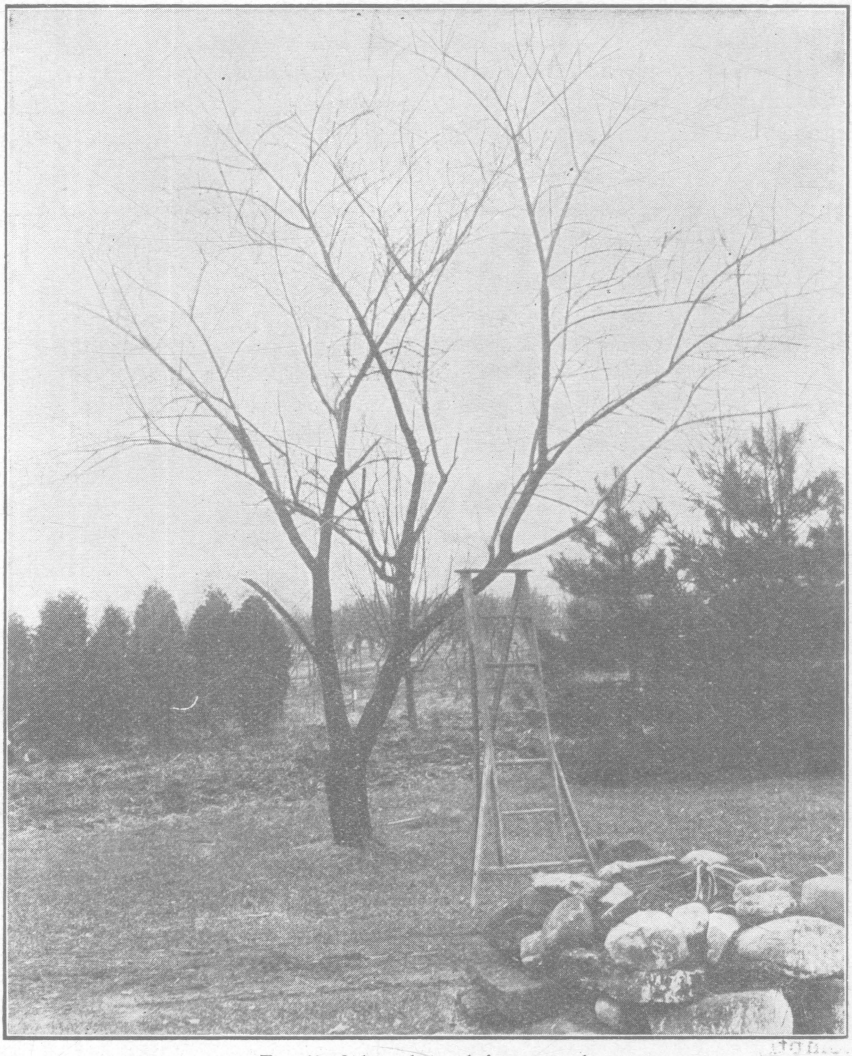

FIG. 10—Old peach tree before renewal.

Fig. 10 shows an old peach tree standing on the rear lawn at the South Farm. In Fig. 11 is shown the same tree cut back in renewal, and in Fig. 12 the same tree at the close of the first growing season following renewal.

Fig. 13 shows younger trees which have been severely cut back, just at the time the new shoots are pushing forth from the branches. In Fig. 14 is pictured a section of the peach orchard during the first growing season after renewal, showing the low, dense, compact, symmetrical character of trees which were formerly much too tall, straggling and irregular in form. This heavy growth of new wood will, of course, have to be thinned with the pruning shears, and the shoots selected to remain, cut back from one-third to one-half their length. Successive annual prunings will be done with a view to retaining the advantage gained by renewal—a low, easily accessible head abounding in vigorous fruiting wood.

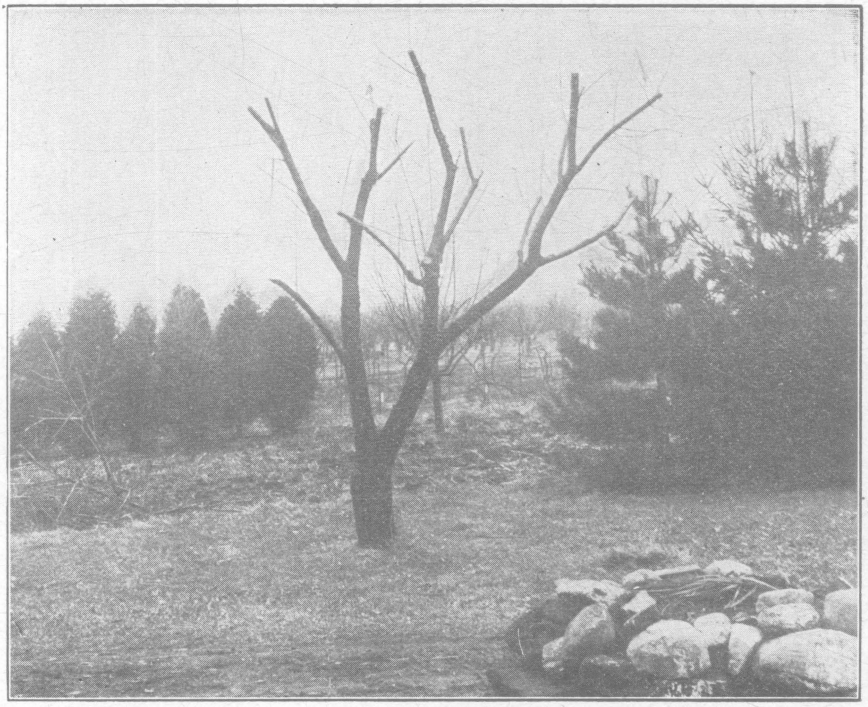

FIG. 11—Old peach tree after cutting back.

Plum trees, European, native and Japanese, respond very promptly and satisfactorily to the process of renewal. The behavior of the European class, under heavy cutting, is very similar to that of the apple, while the native and Japanese classes may justly be likened to the peach with which their treatment is identical.

The entire plum orchard at the Experiment Station, embracing all classes, and at least one hundred and fifty varieties, was renewed at the spring pruning of 1906. The older trees had become ill-shaped, low in vigor, difficult to spray and prune, and the gathering of fruit from the topmost branches could no longer be conveniently done from the step-ladder. The results from cutting back these

FIG. 12—Old peach tree rejuvenated. First season's growth after cutting back.

trees are very satisfactory indeed. There was secured, the first season after renewal, a vigorous, well distributed growth of new wood, forming low, round-topped, symmetrical trees which, for years to come, may be pruned and sprayed with convenience and ease, and from which the fruit may be readily gathered with six and eight foot step-ladders.

FIG. 13—Younger peach trees cut back for renewal. Young shoots just starting.

FIG 14—Young peach orchard renewed. After one season's growth.

SUMMARY.

Old fruit trees and orchards are oftentimes destroyed to prevent the spread of disease and noxious insects to newly planted orchards.

Old orchards can be renewed in such a way as to produce fine fruit for home and market while the young trees are growing.

The plan of renewal brings about conditions under which insects and fungi can be so easily and effectually combatted and controlled as to reduce to a minimum the danger of their spread to younger plantations.

Renewal is a reversal of the generally prevailing idea of "pruning up" old trees. It is distinctly a process of "pruning down."

The type of trees with which renewal is not practicable is that type whose heads have been formed at an extreme height from the ground, and whose naked branches, from that elevated point of divergence, extend many more feet upward and outward with no intervening smaller branches. Usually a tree that was originally headed moderately low, and whose lower branches are in good condition, can be successfully renewed.

Cut out the topmost branches the first season of renewal, leaving all healthy side branches. The next season these horizontal branches may have their extremities lopped back with the pruners in such a way as to promote a uniform, well-rounded, symmetrical head or top.

It will be necessary to saw large branches first on the under side then on the upper side, a few inches farther out or up the branch in the direction of its growth. This allows the branch to break off without splitting the part remaining. A second cut, at an angle, can then be made without difficulty, leaving a smooth, clean-cut stub.

All wounds should be dressed, a few weeks after cutting, with a thick paint made of pure white lead and boiled linseed oil.

The benefits of heading back will be lost, in time, unless the work be followed up by annual, discriminate thinning of the new shoots, and cutting back of those selected for future fruit bearing.

Renewal of orchards may profitably be accompanied by the addition of stable manure, either worked into the soil beneath the extremities of the branches, or allowed to remain upon the surface to be covered later with straw or other coarse material applied as a mulch. The combination of renewal and fertilization will work wonders in the rejuvenation of many old orchards long considered unprofitable and valueless.

This page intentionally blank.